# Defense Message System (DMS)

Plan for Implementation, Infrastructure Operations & Maintenance

## US Army Corps of Engineers

### DMS BACKGROUND

The evolution of the Defense Message System (DMS) is the result of a 1988 ASD/C3I initiative to determine the future of DOD electronic messaging systems. DMS is based on a need to replace the labor intensive and costly AUTODIN message system. Key factors which led to this effort were the acknowledged obsolescence of existing systems --including the Year 2000 problem, and the emergence of new messaging standards and technology. Rather than providing a centralized delivery point, such as a message center, delivery of message traffic will be writer to reader – personal computer to personal computer. DMS has been declared by DOD/Army to be the mandatory messaging system for military command and control.

For over two decades, the National Command Authority (NCA), has relied upon the AUTODIN military messaging system to transmit command and control messages. The AUTODIN delivery system is paper based and backup Continuity of Operations Plan (COOP) services were based on geographic proximity (your backup delivery site had to be the closest military facility to your location). The Corps currently operates 37 AUTODIN message centers with an aggregate 75 FTE support. The remaining 30 Corps sites are currently piggybacked on other government agencies for their military messaging traffic.

### DMS OBJECTIVES

DMS objectives include:

a. Transition messaging functions from the centralized AUTODIN and telecommunications center configuration to the X.400/X.500 E-mail configuration. This "eliminate-the-middle-man" approach will shift message handling functions to the user's desktop environment.

b. Develop standard, easy to use, organizational and individual messaging formats and procedures while building in the required security features such as FORTEZZA card encryption, service guarantees, and service standards for organizational messaging.

c. Implement emerging national and international standard protocols for true writer-to-reader interoperable messaging services.

d. Maximize use of DMS enhanced commercially available products procured competitively to minimize costs.

## PROBLEM STATEMENT

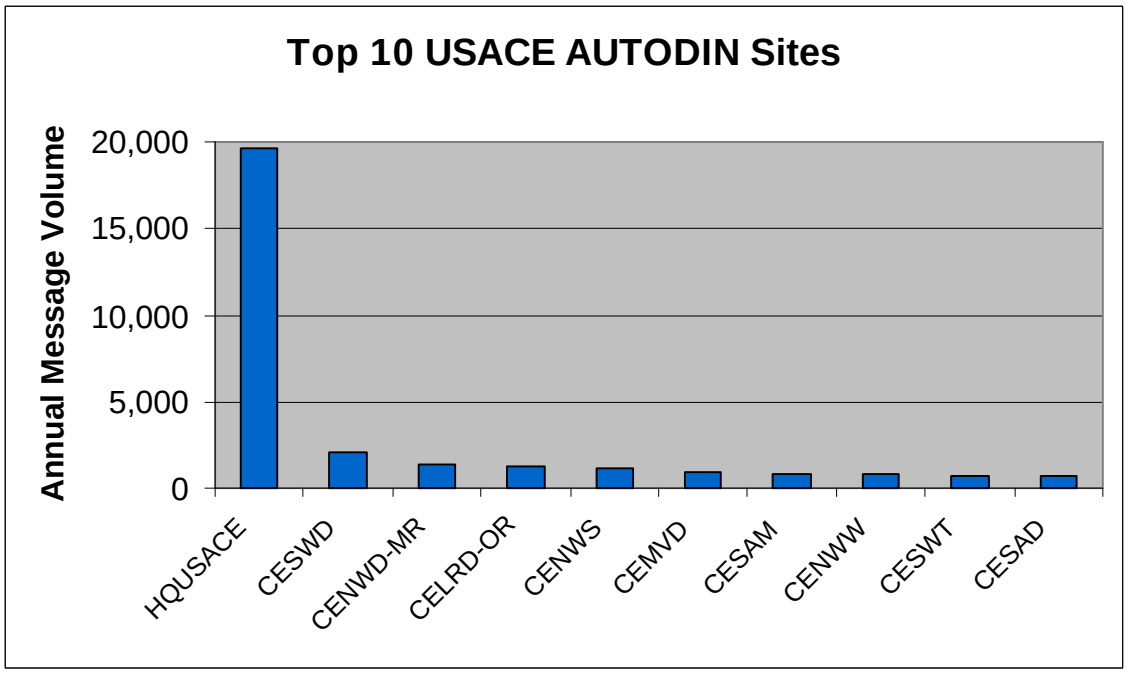
Target date for closing all DOD/Army (including USACE) AUTODIN centers is December 1999. USACE has about 18 months to determine the optimum DMS configuration for replacement of these centers ***and*** to deploy DMS messaging capabilities which will ensure that the Corps, in performance of its command and control responsibilities, can continue to process military messaging traffic.

## CONSIDERATIONS FOR DMS DEPLOYMENT IN THE CORPS

There are key factors that should be considered in DMS deployment decisions within the Corps of Engineers.

### FACTOR A. AUTODIN TRAFFIC PROFILE

The 37 USACE AUTODIN centers (which will be terminated), currently process ***both*** classified and unclassified military messaging traffic (@ 42,200+ annually). The 30 remaining Corps sites that are currently supported by other government agency send/receive approximately 24,490 classified and unclassified messages annually. This combined military messaging traffic of about 66,690 military mail messages per year is in addition to the Corps existing e-mail system traffic. The Corps present e-mail systems will generally not be impacted by this additional messaging traffic workload, as military messaging traffic only represents an approximate 1% annual increase to the Command's inter organizational annual baseline e-mail traffic of 6,000,000+ messages. Below is a graph of the total annual AUTODIN message traffic (send & receive) for the Top-10 sites in the US Army Corps of Engineers.




Within the USACE AUTODIN environment, classified traffic represents less than 6% of the total AUTODIN traffic. Not including HQUSACE, the audience for classified AUTODIN messages typically consists of fewer than 10 individuals per FOA.

In a further breakdown, HQUSACE sends/receives 32% of the total Corps classified traffic and there are some FOA's that receive no classified messages during a given year.

In looking at the relatively low volume of military messaging traffic, some general conclusions can be drawn as considerations in optimizing DMS deployment decisions for the Command. The military messaging traffic will not create an excessive additional load on the existing system. By porting unclassified military messaging traffic to the existing Corps E-Mail system, 94% of the DMS requirement for the Corps can be quickly and economically accomplished within the existing commercial infrastructure.

## FACTOR B. PRESENT CORPS E-MAIL ARCHITECTURE

DMS uses commercially available software as its basis, with an **enhanced DMS Security module**, in this case Microsoft Exchange. The Corps of Engineers has a strong background in the use of corporate wide X.400/X.500 E-Mail and presently uses Microsoft Exchange at 25% of its sites and its anticipated that the majority of its sites will be using Microsoft Exchange by 1 January 1999. *The existing DMS architecture does not permit the porting of encrypted classified messages away from DMS systems.* DMS message

traffic must initially be routed through DMS hubs. However, by utilizing the existing Corps enterprise E-Mail infrastructure, it is possible to simply port unclassified DMS mail through the DMS hubs to existing Corps-owned Microsoft Exchange platforms, thus minimizing the DMS startup, deployment and operations costs.

The use of E-Mail within the Corps of Engineers was pioneered at the Mississippi Valley Division/Vicksburg District in the early 1990s and the Electronic Mail Mandatory Center of Expertise was established at the Northwestern Division/Portland District in 1995. Thus the Corps has considerable in-house E-Mail expertise to realize economies in the initial deployment of DMS and the ultimate Corps wide operation of DMS by utilizing existing expertise and infrastructure.

## FUNDING

DOD and HQDA are funding for the major items of backbone and hub equipment (various servers to support the mail, address book, profiling, management, etc.), required to implement DMS. This means that HQDA has programmed to provide the Corps its suite(s) of DMS "hub" equipment. While it is true that DMS is based upon commercially available software, the initial deployment of DMS could prove quite costly because of hardware constraints presently inherent to the DMS architecture. A minimal DMS Local Control Center site will consist of a minimum of 11 data processing devices running three different operating systems. It is estimated that 6 to 8 FTE's with adequate knowledge and skills will be required to establish, operate and manage a DMS hub. This is an extremely important factor in weighing DMS deployment alternatives within the Command. Contract site engineering and installation support will be provided through HQDA DMS Program Manager's funds, as well as hub equipment maintenance calls for a 3-year period following DMS equipment installation. Just as with operation of the AUTODIN centers, each Command is expected to absorb the operation of its installed DMS "hubs". The Corps has several alternatives for funding DMS operational support for a "hub" site, e.g., raising present Corps mail box rates, reprogramming of QOIM or MS4X military funding accounts, etc.

HQDA has funded for sufficient User Agent equipment to phase the Corps out of its AUTODIN center capability. User Agent equipment is that equipment (PC card readers, FORTEZZA cards and message software) which must reside on an individual personal workstation in order to have secure DMS writer-to-reader military messaging traffic capability. The installation of this PC user agent equipment is expected to be done with internal Corps resources, with the most likely resource being the already established PC customer support centers within each Corps organization. A train-the-trainer concept is envisioned as a critical deployment action, e.g., HQDA DMS Program Management Office

(DMS-A PMO) trains a select Corps cadre, and that cadre, in turn, trains the Corps deployment sites. The DMS-A PMO is also providing computer based training (CBT), for the User Agent software packages.

Based on the relatively low volume, yet critical command and control military messaging traffic, the minimum DMS mailbox configuration within an organization –- *excluding the HQS itself which will be a significantly higher User Agent figure*, is projected as being:

- Division/District Engineer
- Division/District Deputy Engineer
- Deputy District Engineer for PM/Division Equivalent
- Executive Assistant
- Emergency Operations

In the unanticipated event that any additional MACOM User Agent (PC workstation) equipment would be required, (over and above what HQDA is providing), the cost would be approximately $400.00 per desktop. Provided that Corps sites have heeded the ASD C3I guidance of 1994 that all new PC procurements must include the PC card readers, that average desktop cost would be reduced to $200.00.

## ALTERNATIVES FOR DMS DEPLOYMENT

These alternatives address the fielding of DMS initially only at the 37 Corps sites that operate their own AUTODIN centers. Subsequent fielding of DMS to the 30 other Corps sites that currently receive AUTODIN message support from other agencies would then occur as military messaging traffic would automatically be routed through the Corps DMS hub(s).

ALTERNATIVE A. Do not deploy DMS within the Corps of Engineers. This is not considered a feasible alternative, as the closure of Corps AUTODIN centers will leave the Command with no capabilities –except courier and/or physical mail services, to receive and send military messaging traffic related to command and control functions. DMS is a mandatory DOD/HQDA system. Therefore, no analysis of this alternative is pursued.

ALTERNATIVE B. Limit deployment of a single DMS "hub" at one site –-that site being the already established E-Mail MCX. DMS hub hardware would be installed and operated at the MCX. The E-Mail MCX would port unclassified DMS messages to the Corps E-Mail system and maintain and operate all classified DMS mailboxes. This provides for no back up or COOP capability, unless such support could be negotiated with another

being the E-Mail MCX, and the second recommended site being Mississippi Valley Division (MVD) because of its history of e-mail expertise. Those sites would port unclassified DMS messages to the Corps E-Mail system and maintain and operate all classified DMS mailboxes. The Corps workload would be approximately equally split between these two sites and each site would provide operational backup for each other assuring the integrity of DMS message delivery.

ALTERNATIVE D. Deploy DMS "hubs" at multiple [more than two] Corps sites, e.g., by geographic region, MSC, etc. The number of DMS hubs under this alternative could range from 3 to 67. Each established "hub" site would port unclassified DMS messages to their (or their customer's) local E-Mail system and maintain and operate classified DMS mailboxes for their customers. Each site would be responsible for establishing their own backup capability.

ALTERNATIVE E. Outsource DMS support for the Corps of Engineers to another military agency, rather than using in house e-mail expertise. Locate an outside agent, e.g., other military MACOM, that would provide DMS support for the Corps of Engineers military command and control messaging capability on a reimbursable basis. Current Defense Intelligence Agency and National Security Agency policy prohibits the commercialization of these services as an unacceptable risk for the security of national intelligence.

## ANALYSIS OF ALTERNATIVES

The following are the alternatives, with a cost breakdown at Table 1.

ALTERNATIVE A. Not analyzed.

ALTERNATIVE B. Deploy DMS "hub" at One Site. This alternative represents the least cost alternative for the Corps of Engineers as hardware and personnel required to provide DMS "hub" capability to the Corps would be totally centralized at the present E-Mail MCX. The MCX would port unclassified DMS messages via the CEAP Network to local Corps E-Mail systems and maintain and operate all classified DMS mailboxes at the centralized site. The reliability of unclassified DMS message delivery would be only as good as the FOA's local E-Mail capability. Users would retrieve encrypted classified and sensitive-but-unclassified DMS messages from the single site via the CEAP Network or via

dial-up modem in the case of network failure. There would be no backup for DMS message delivery, for either message category, should hardware, power, disaster, etc. make the single site inaccessible.

ALTERNATIVE C. Deploy DMS at Two Sites. This alternative represents the second least cost alternative for the Corps of Engineers , with DMS "hubs" located at the E-Mail MCX and MVD. However it approximately doubles the single site cost as hardware and personnel required to provide DMS capability to the Corps would be totally duplicated and redundant at both sites. Each site would port unclassified DMS messages via the CEAP Network to local Corps E-Mail systems and maintain and operate all classified DMS mailboxes at the centralized sites. The reliability of unclassified DMS message delivery would be only as good as the FOA's local E-Mail capability. Users would retrieve encrypted classified and sensitive-but-unclassified DMS messages from their primary service site via the CEAP Network or via dial-up modem in the case of network failure. Users would retrieve encrypted classified and sensitive-but-unclassified DMS messages from the alternate site should hardware, power, disaster, etc. make their primary site inaccessible. One site would port the unclassified DMS messages for the entire Corps of Engineers should the other site fail or become inaccessible.

ALTERNATIVE D. Deploy DMS at three or more Corps sites, such as by geographic region or MSC. Taken to the extreme, this could mean 67 DMS "hubs" installed and supported throughout the Corps - - this is in line with DOD/Army DMS strategy for Posts, Camps and Stations with 50 users or more. This option is significantly more costly in terms of manpower and dollars than those options considering the deployment of DMS hardware at only one to two sites. It requires the deployment of a minimal DMS hardware configuration of 11 data processing devices and personnel to operate and manage them at each DMS hub site. On the positive side, this deployment strategy would have extremely wide distribution, which would promote considerable expertise located within the Corps. Since each site would operate autonomously from others, the need for backup and redundancy would be reduced. Failure at a given site would only impact that individual site and its customers. Each FOA could institute backup agreements with other FOA's.

ALTERNATIVE E. Outsource DMS support for the Corps of Engineers to another military agency and not leverage the E-Mail MCX expertise. The challenge is to find an entity willing *and technically capable* of providing DMS service to the entire Corps of Engineers. That is, port both classified and unclassified DMS traffic to the existing Corps E-Mail infrastructure and therefore take responsibility of delivery through a foreign system outside of their control. In order to accommodate the Corps DMS requirements, it is assumed that the servicing MACOM/Agency would have to establish a separate DMS hub site. This would include the full DOD/Army recommended complement of 11 FTE plus overhead.

# NOTIONAL ANALYSIS OF ALTERNATIVES

| | | Estimated Annual Cost | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Configuration Alternative** | **Corps Control** | **FY 99** | **FY 00** [5] | **FY 01** [5, 6] | **FY 02** [5] | **FY 03** [5] | **Back Up/ COOP Capability** | **DoD/DA Compliance** |
| "A" No DMS | N/A | $0.0 | $0.0 | $0.0 | $0.0 | $0.0 | N/A | **NO** |
| "B" 1 Hub | YES | $420K [1] | $437K | $1.2M | $1.3M | $1.4M | NO | YES |
| **"C" 2 Hubs** | **YES** | **$1.0M** [2] | **$1.1M** | **$1.9M** | **$2.0M** | **$2.1M** | **YES** | **YES** |
| "D" Multiple Hubs | YES | $2.0M to [3] $45.6M | $2.1M to $47.4M | $2.2.M to $49.3M | $2.3M to $51.3M | $2.4M to $53.4M | YES | YES |
| "E" Outsource | NO | $1.6M [4] | $2.2M | $2.4M | $2.5M | $2.6M | NO | YES |

**1** Represents DMS deployment costs above the present E-Mail MCX budget of $1.1M. It is assumed in FY99 that the MCX budget will remain at the same FY98 level. As DMS is implemented, the workload transitions from legacy e-mail to DMS.

**2** In addition to projected DMS deployment costs for the present E-Mail MCX, these costs include establishment of the Vicksburg DMS hub.

**3** Cost estimate based on establishment of a range of 3 to 67 DMS hubs, each supported by an average of 8 FTE at a cost of $85K per FTE. Minimizes travel/training costs associated with deployment, as each site/region establishes their own hub.

**4** Cost estimate based on outsource personnel strength of 11 FTE (the DMS/Army standard), for a single Corps hub, plus 35% overhead, and DMS deployment costs.

**5** These columns include a 4% inflation increase per year.

**6** DMS deployment costs terminate, but O&M for the entire E-Mail operation will remain for out years. The majority of the backbone costs transitions from legacy to DMS backbone support beginning in FY01.

## RECOMMENDATION

The Corps of Engineers should implement DMS in the most cost affective manner that completely satisfies military messaging requirements *and* assures highly responsive command and control electronic messaging capabilities. Alternatives in the order of recommendation include:

**ALTERNATIVE C.** Deploy DMS "hubs" at both the E-Mail MCX and MVD to ensure responsive military messaging capabilities as well as to provide back up/coop operational capabilities essential to military command and control functions. **HIGHLY RECOMMENDED –- MINIMIZES RISK FOR UNINTERUPTED DELIVERY OF COMMAND & CONTROL E-MAIL.**

**ALTERNATIVE B.** Deploy DMS "hub" at the E-Mail MCX only. Implementation of DMS at a single centralized hub site will not provide backup operational capability and will not guarantee delivery of Department of Defense command and control messaging. If the DMS "hub" is down, the Corps will not be postured to send or receive military messaging traffic –particularly critical in times of emergency operations.
**CREATES THE PROBABILITY THAT THERE WILL BE PERIODS THAT COMMAND & CONTROL E-MAIL CANNOT BE DELIVERED.**

**ALTERNATIVE D.** Deploy DMS "hubs" at more than two Corps sites**. NOT RECOMMENDED – HIGH COST OPERATIONAL OPTION**

**ALTERNATIVE E.** Outsource DMS support, including paying another agency's overhead cost to provide service to the Corps**.** Outsourcing DMS support would result in another layer of complexity and operational management of Corps E-Mail systems. The Corps could loose control of its own network; in house FTE expertise would diminish; and, projected costs would be significantly higher than a Corps owned and operated system. **NOT RECOMMENDED**.

**ALTERNATIVE A.** Do not deploy DMS. **NOT CONSIDERED**. **DMS IS THE *MANDATORY* DOD/HQDA MESSAGE SYSTEM FOR MILITARY COMMAND AND CONTROL PURPOSES.**

## SCHEDULE FOR IMPLEMENTATION

DMS capability must be fully deployed DOD wide by 1 January 2000. AUTODIN centers go out of business on that date. DOD calls for a phased implementation of DMS with unclassified military messaging traffic migrating away from AUTODIN starting

immediately and classified military messaging traffic beginning about 1 Jan 1999. The Corps was chosen as a candidate for early deployment within the Army because of the extensive X.400/X.500 E-Mail expertise within the Corps. This deployment has been further enhanced by the recent command direction in establishment of Exchange/Outlook desktop client as the HQS flagship standard. For testing purposes, a DMS site hardware and software "hub" suite was delivered to Portland, OR, during November of 1997. The Portland site was installed for testing purposes during April of 1998.

DMS military messaging capabilities must be extended to all Corps sites by December 1999, meaning that the Corps has 18 months to reach full deployment to 67 sites. Upon completion of testing of the DMS "hub" equipment suite in Portland, the local CENWD sites would participate in expanded DMS testing through June 1998. Following the successful accomplishment of these tests and DMS deployment decisions by HQUSACE, the recommended DMS fielding (user agents) strategy would be as follows:

June 1998 – September 1998:

Testing completed and 15 Corps AUTODIN sites phased out with deployment of DMS capabilities. Final selection of sites would be based on a combination of considerations, e.g., completed organizational migration to Exchange/Outlook desktop client, military mission support, geographic/organizational relationships, etc.

October 1998 – September 1999:

Phase out remaining 22 Corps AUTODIN sites with deployment of DMS capabilities and extend DMS User Agent capabilities to 10 Corps sites currently serviced by other DoD agencies to bring all Corps organizations into a common e-mail architecture.

October 1999 - December 1999:

Extend DMS User Agent capabilities to remaining 20 Corps sites currently serviced by other DoD agencies to bring all Corps organizations into a common e-mail architecture.

## SUMMARY

The DMS Program is in reality an organized process to coordinate (vs manage) DOD's evolution from the AUTODIN and Legacy E-mail messaging services provided by the DMS Baseline Architecture, to the mature desktop user messaging capabilities provided by the DMS Target Architecture. This timely DOD initiative is designed specifically for Joint Service and agency exploitation of technology and standards

advances to support satisfaction of message writer and reader requirements in a resource constrained environment.

The fact remains that this is an extremely time sensitive schedule, as all AUTODIN centers *must* be terminated by December 1999. There is some discussion ongoing at the J6 level for the extension of a few AUTODIN Switching Centers beyond December 1999. However, this is in the context of messaging support only for the Intelligence Community until such time as the TS/SCI capability becomes a reality. If the Corps begins in June 1998, that will leave only *18 months* to reach full deployment. If a DMS deployment decision lingers beyond this time frame, the schedule becomes even more compressed and resource intensive to execute. The worst scenario is that failure to meet AUTODIN center closing schedules will mean that the Corps will be extremely limited –-or even completely unable in its capability to receive/send any military message traffic beginning January 2000.